Docket No. 2003P14810US

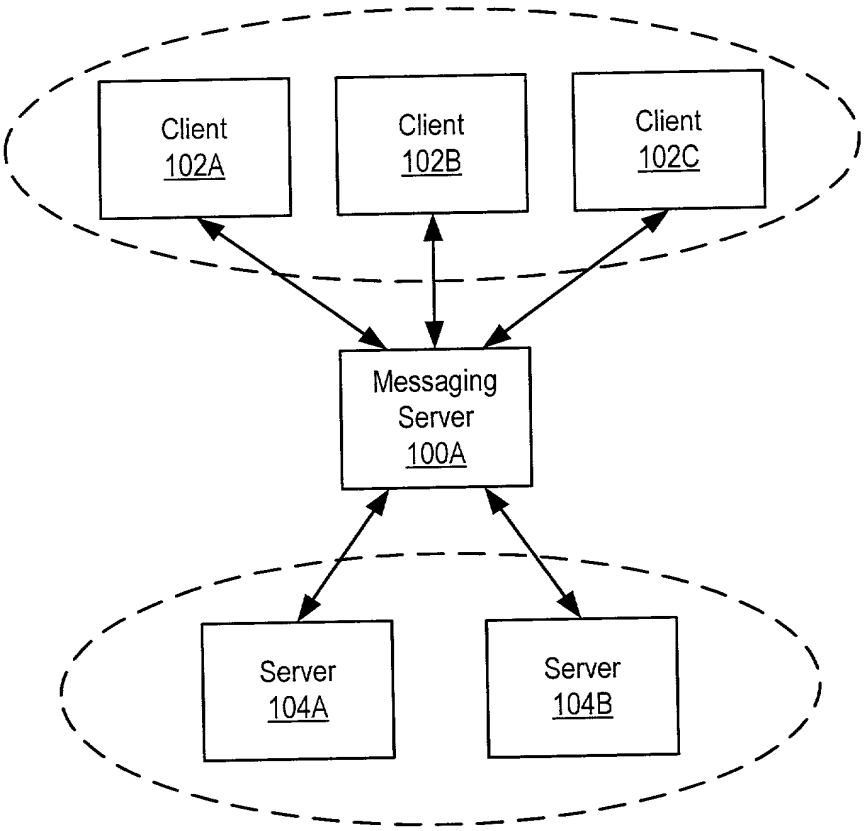

Figure 1 - Prior Art

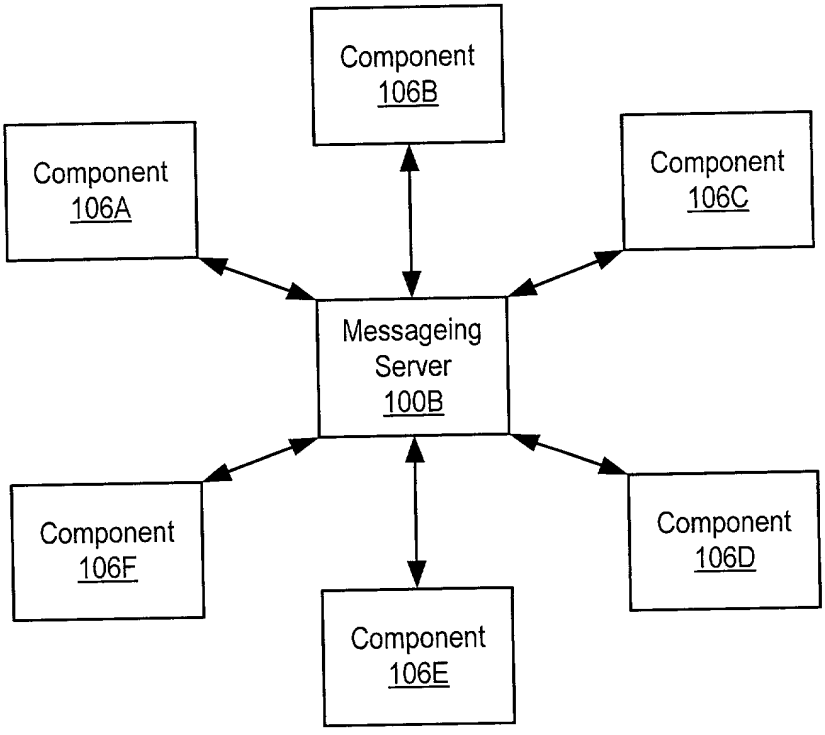

Figure 2 - Prior Art

Document Attached

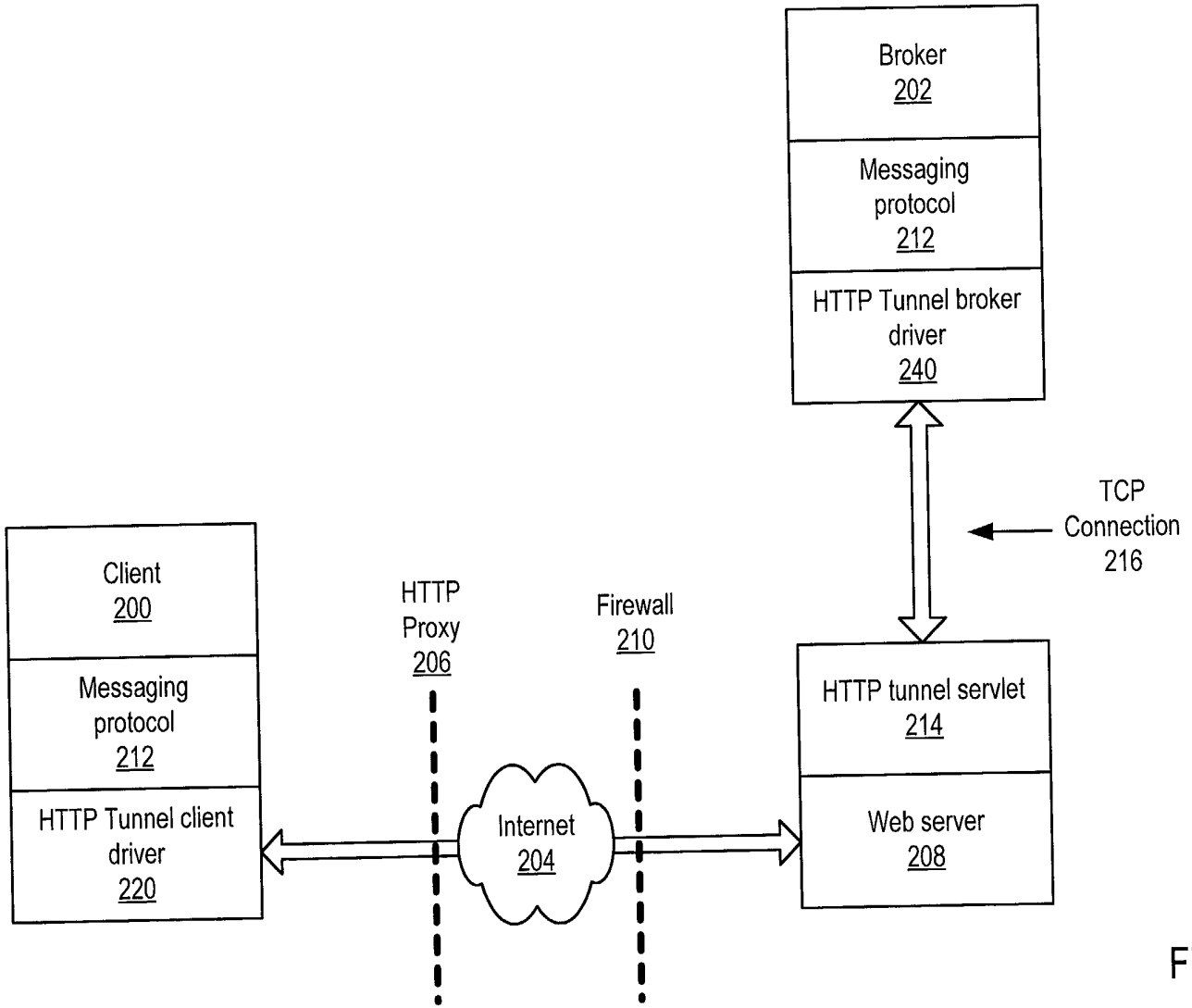

Figure 3A

Toshiba Attached

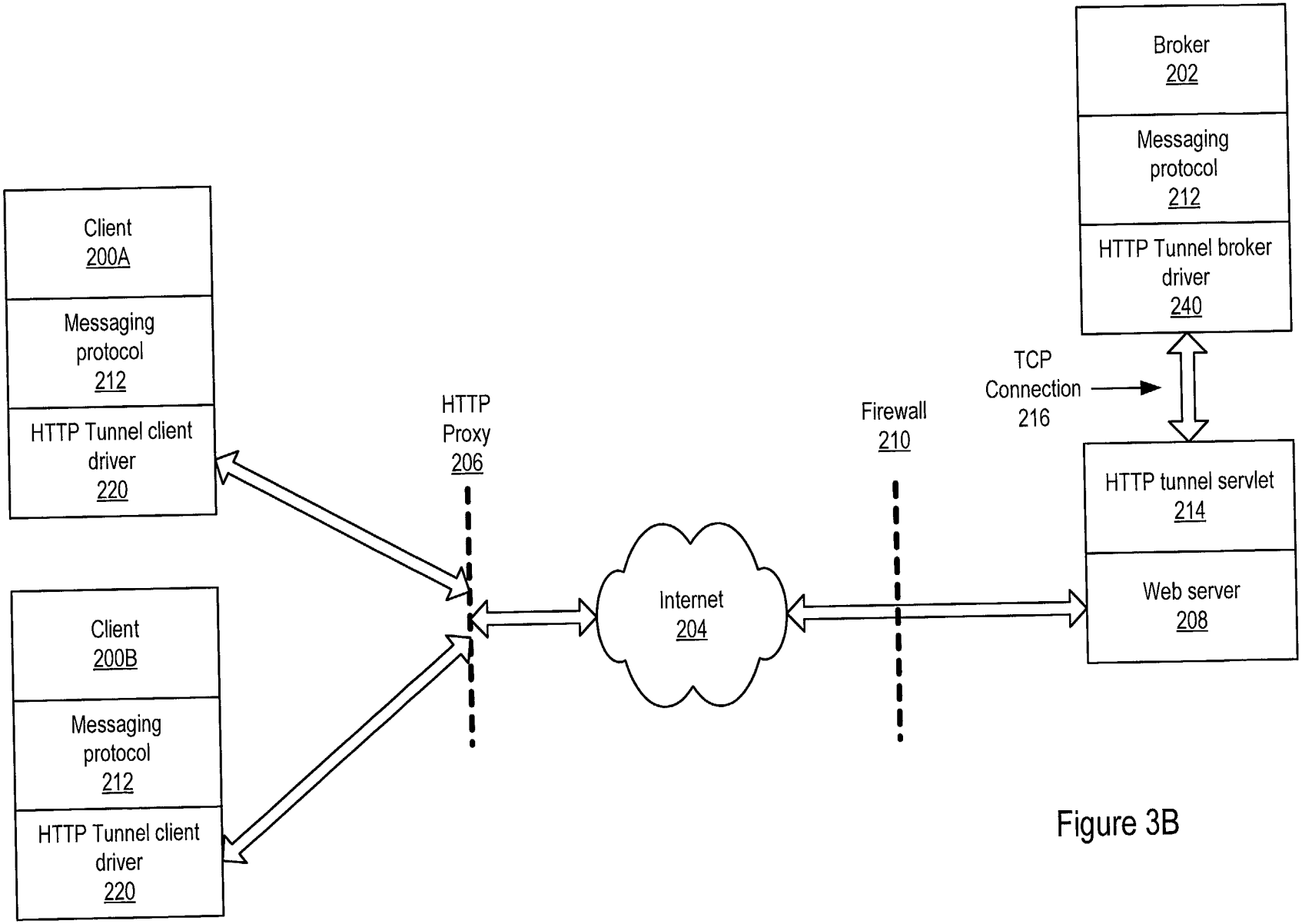

Figure 3B

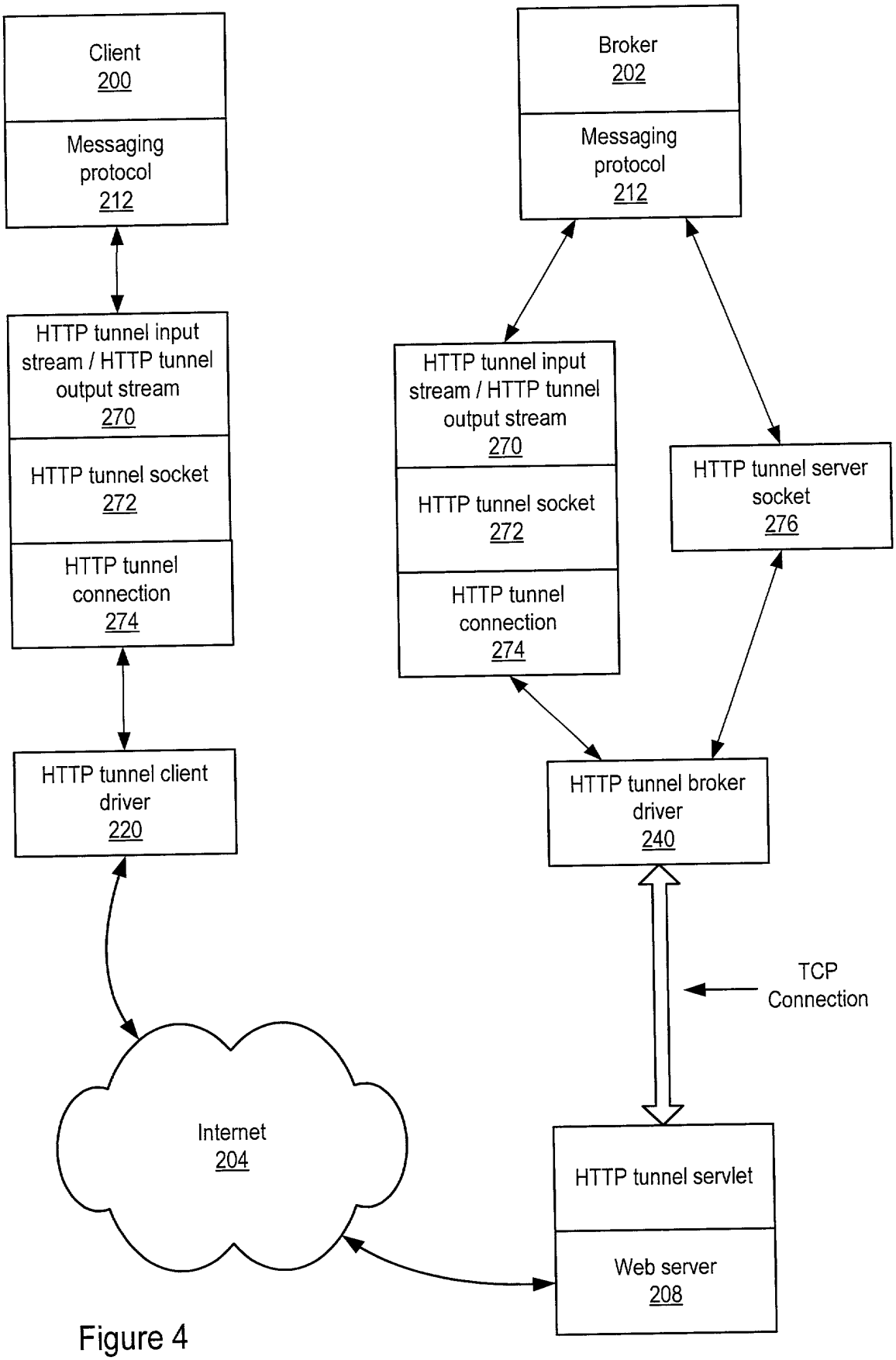
Client
200
Messaging protocol
212
HTTP tunnel input stream / HTTP tunnel output stream
270
HTTP tunnel socket
272
HTTP tunnel connection
274
HTTP tunnel client driver
220
Broker
202
Messaging protocol
212
HTTP tunnel input stream / HTTP tunnel output stream
270
HTTP tunnel socket
272
HTTP tunnel connection
274
HTTP tunnel server socket
276
HTTP tunnel broker driver
240
TCP Connection
Internet
204
HTTP tunnel servlet
Web server
208

Figure 4

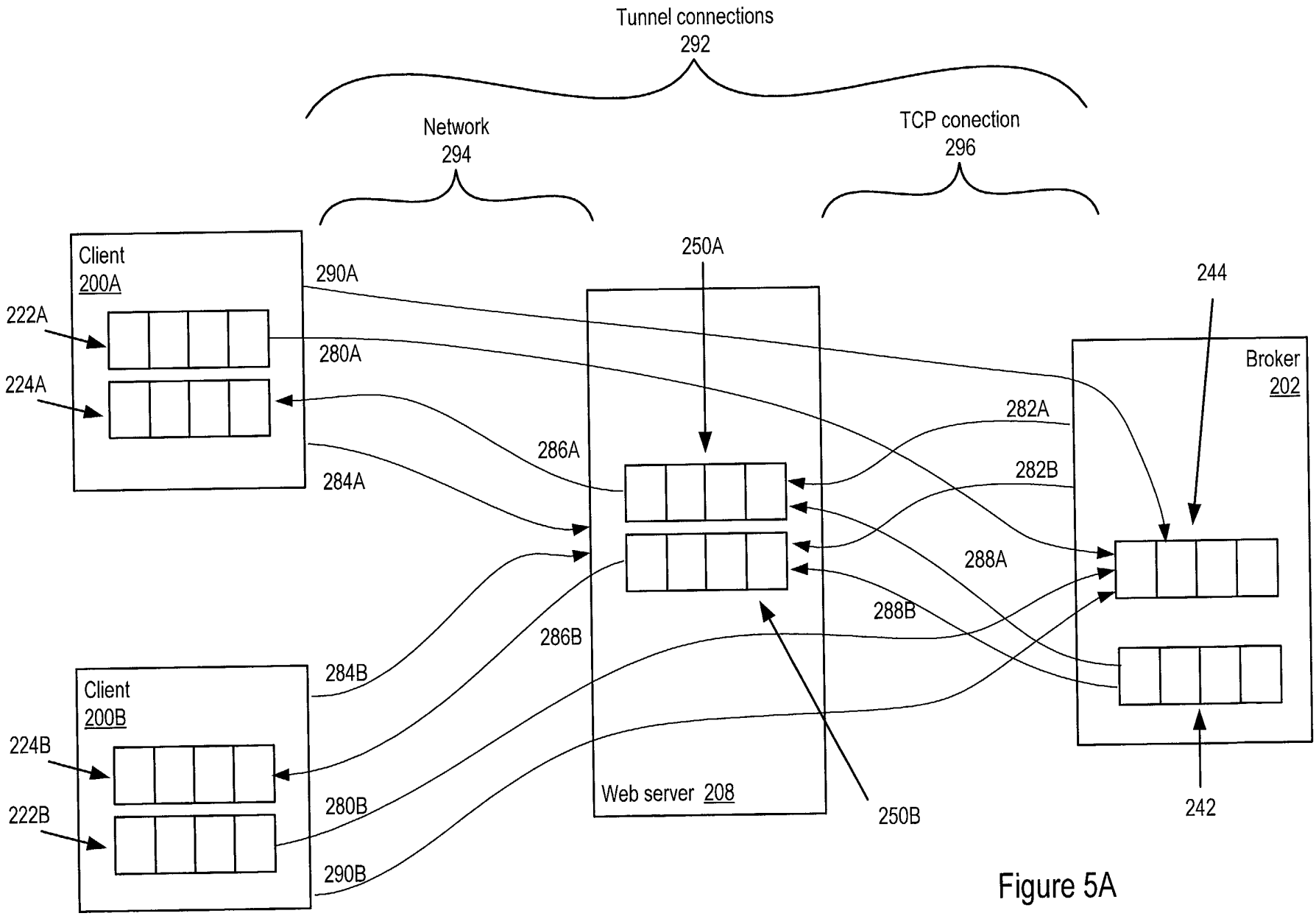
Tunnel connections
292
Network
294
TCP conection
296
Client
200A
222A
224A
290A
280A
284A
250A
244
Broker
202
282A
282B
286A
288A
288B
286B
284B
Client
200B
224B
222B
280B
290B
Web server 208
250B
242

Figure 5A

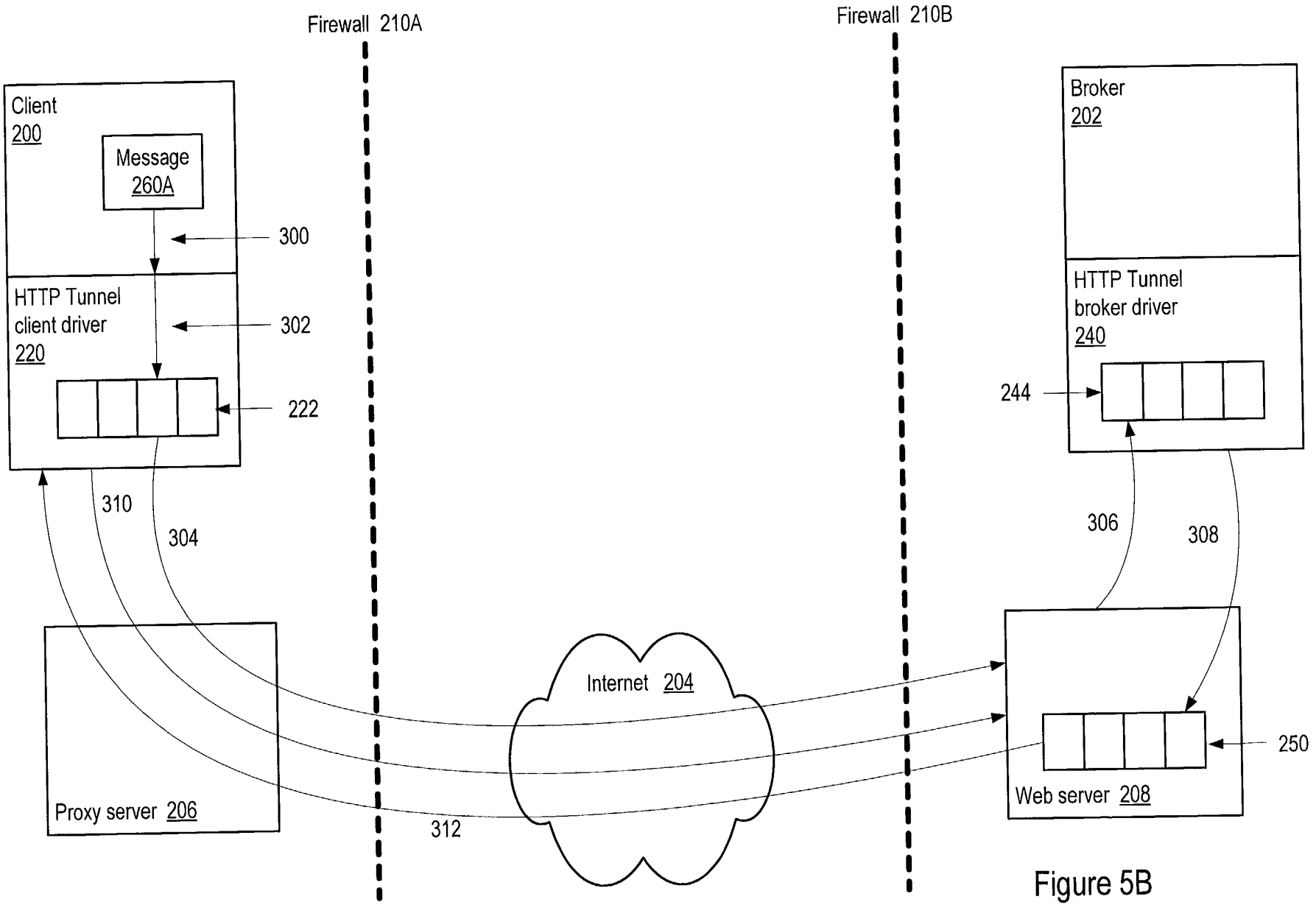
Firewall 210A
Firewall 210B
Client
200
Message
260A
300
HTTP Tunnel
client driver
220
302
222
Broker
202
HTTP Tunnel
broker driver
240
244
310
304
306
308
Internet 204
Proxy server 206
312
Web server 208
250

Figure 5B

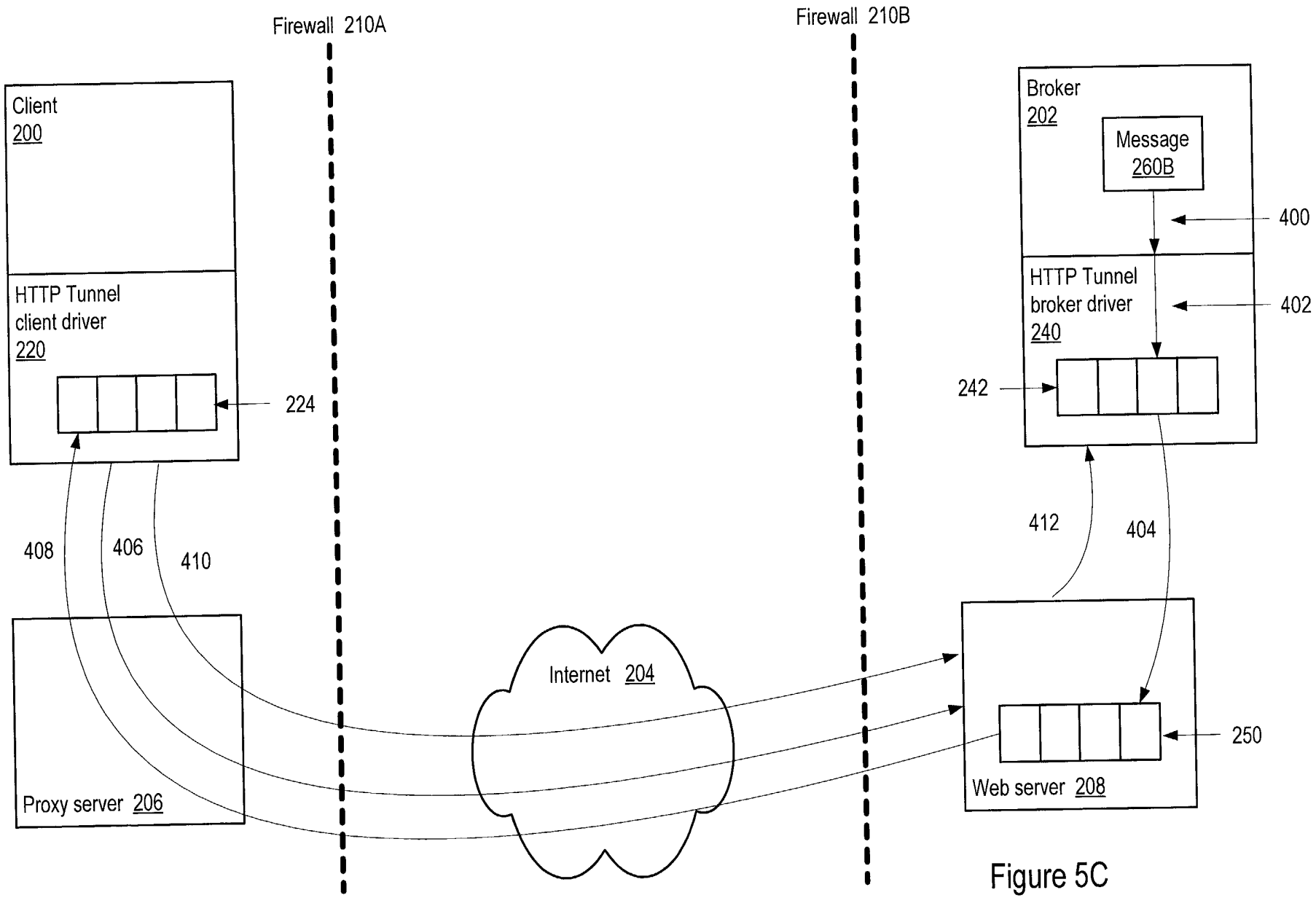
Firewall 210A
Firewall 210B
Client
200
HTTP Tunnel
client driver
220
224
Broker
202
Message
260B
400
HTTP Tunnel
broker driver
240
402
242
408
406
410
412
404
Internet 204
Proxy server 206
Web server 208
250

Figure 5C

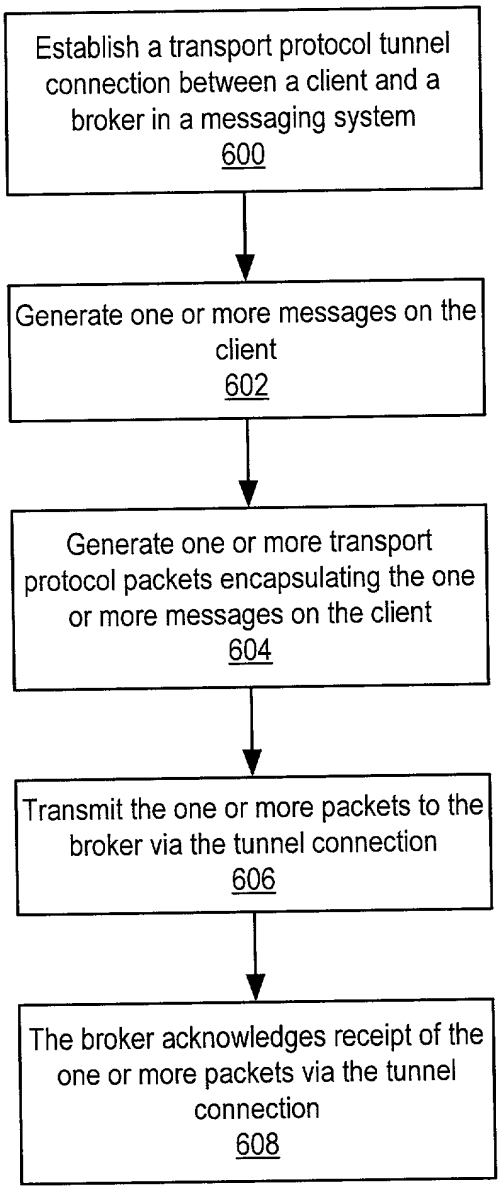
Establish a transport protocol tunnel connection between a client and a broker in a messaging system
600
Generate one or more messages on the client
602
Generate one or more transport protocol packets encapsulating the one or more messages on the client
604
Transmit the one or more packets to the broker via the tunnel connection
606
The broker acknowledges receipt of the one or more packets via the tunnel connection
608

Figure 6A

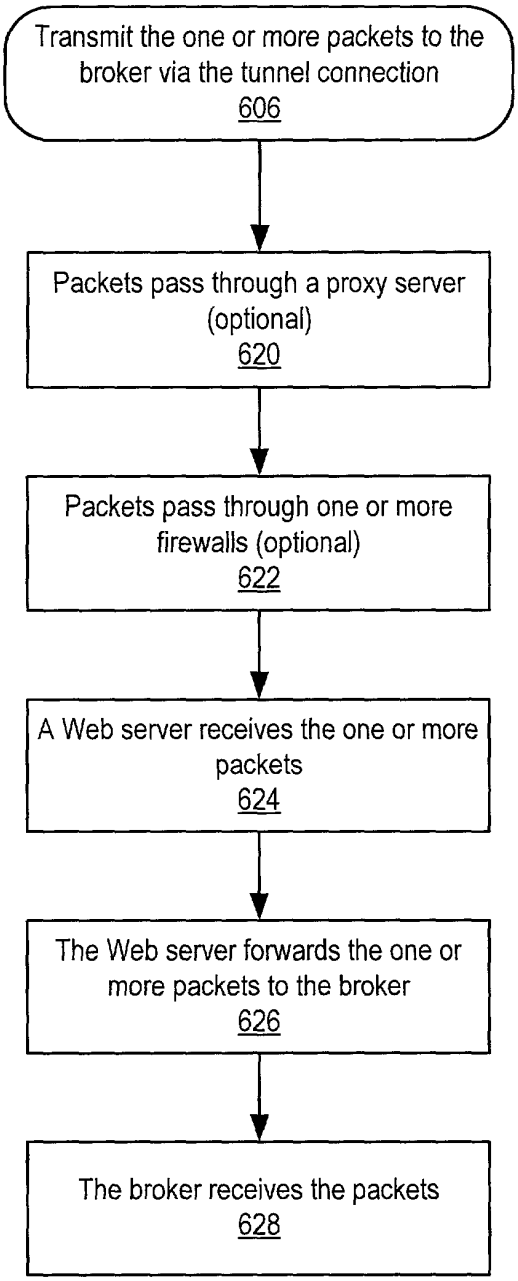
Transmit the one or more packets to the broker via the tunnel connection
606
Packets pass through a proxy server (optional)
620
Packets pass through one or more firewalls (optional)
622
A Web server receives the one or more packets
624
The Web server forwards the one or more packets to the broker
626
The broker receives the packets
628

Figure 6B

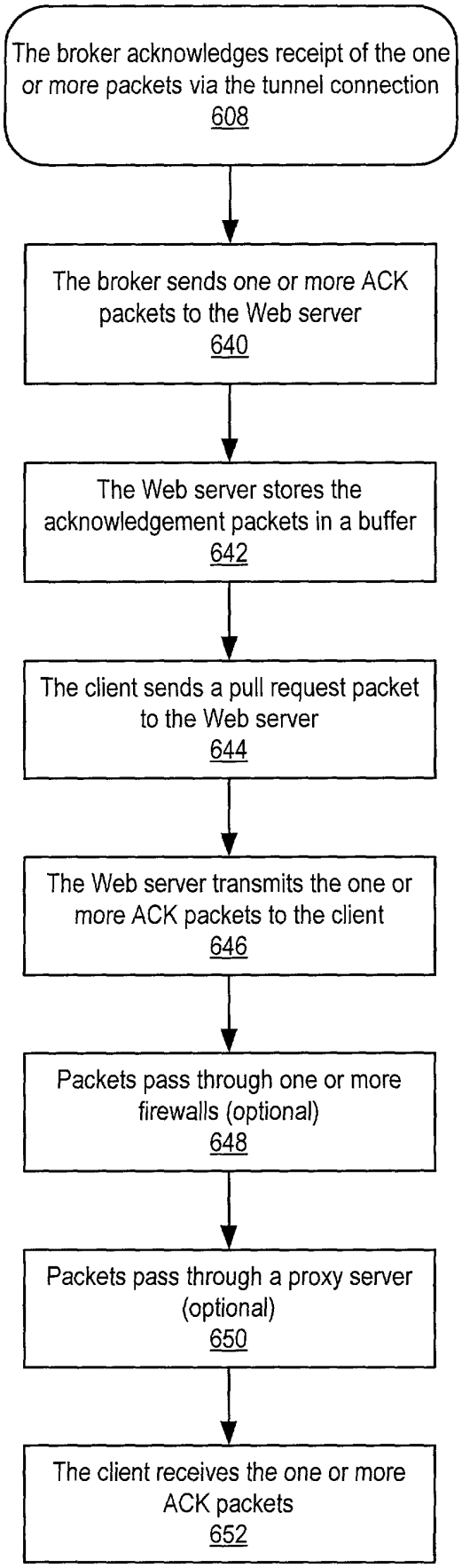
The broker acknowledges receipt of the one or more packets via the tunnel connection
608
The broker sends one or more ACK packets to the Web server
640
The Web server stores the acknowledgement packets in a buffer
642
The client sends a pull request packet to the Web server
644
The Web server transmits the one or more ACK packets to the client
646
Packets pass through one or more firewalls (optional)
648
Packets pass through a proxy server (optional)
650
The client receives the one or more ACK packets
652

Figure 6C

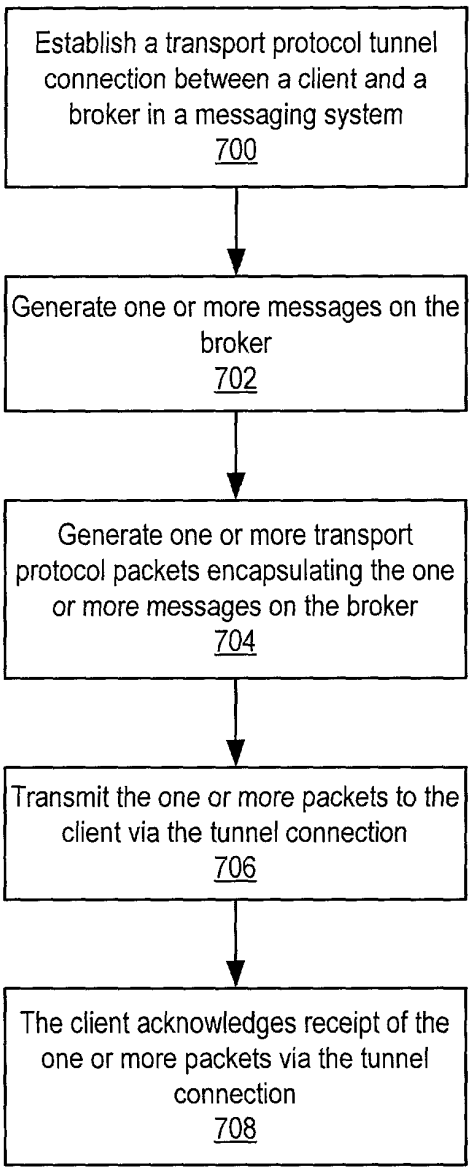
Establish a transport protocol tunnel connection between a client and a broker in a messaging system
700
Generate one or more messages on the broker
702
Generate one or more transport protocol packets encapsulating the one or more messages on the broker
704
Transmit the one or more packets to the client via the tunnel connection
706
The client acknowledges receipt of the one or more packets via the tunnel connection
708

Figure 7A

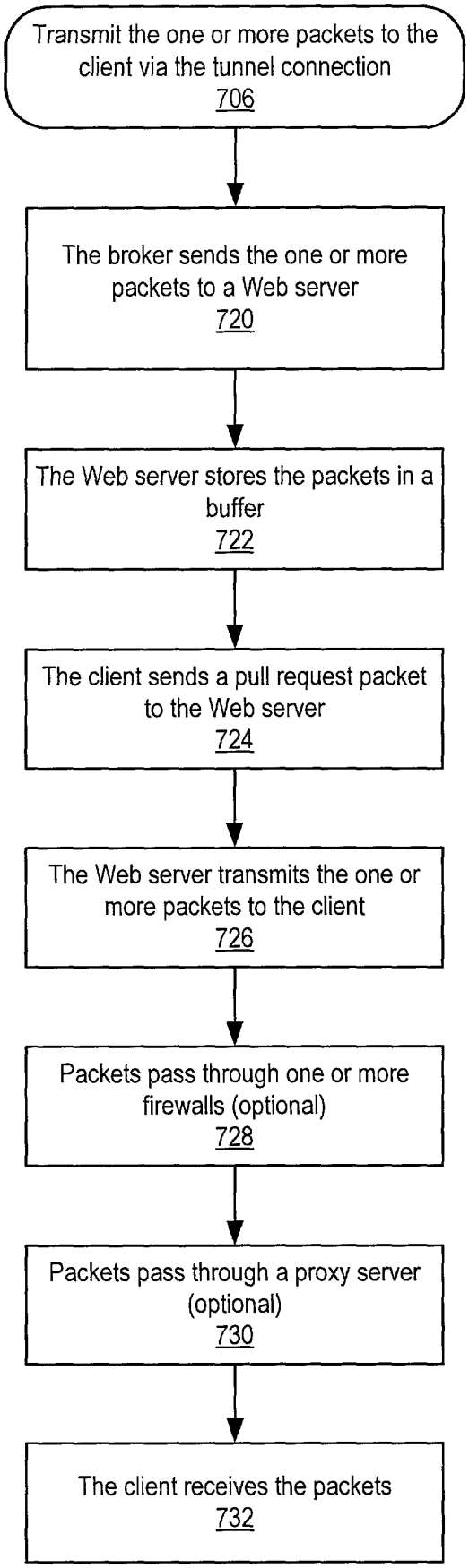
Transmit the one or more packets to the client via the tunnel connection
706
The broker sends the one or more packets to a Web server
720
The Web server stores the packets in a buffer
722
The client sends a pull request packet to the Web server
724
The Web server transmits the one or more packets to the client
726
Packets pass through one or more firewalls (optional)
728
Packets pass through a proxy server (optional)
730
The client receives the packets
732

Figure 7B

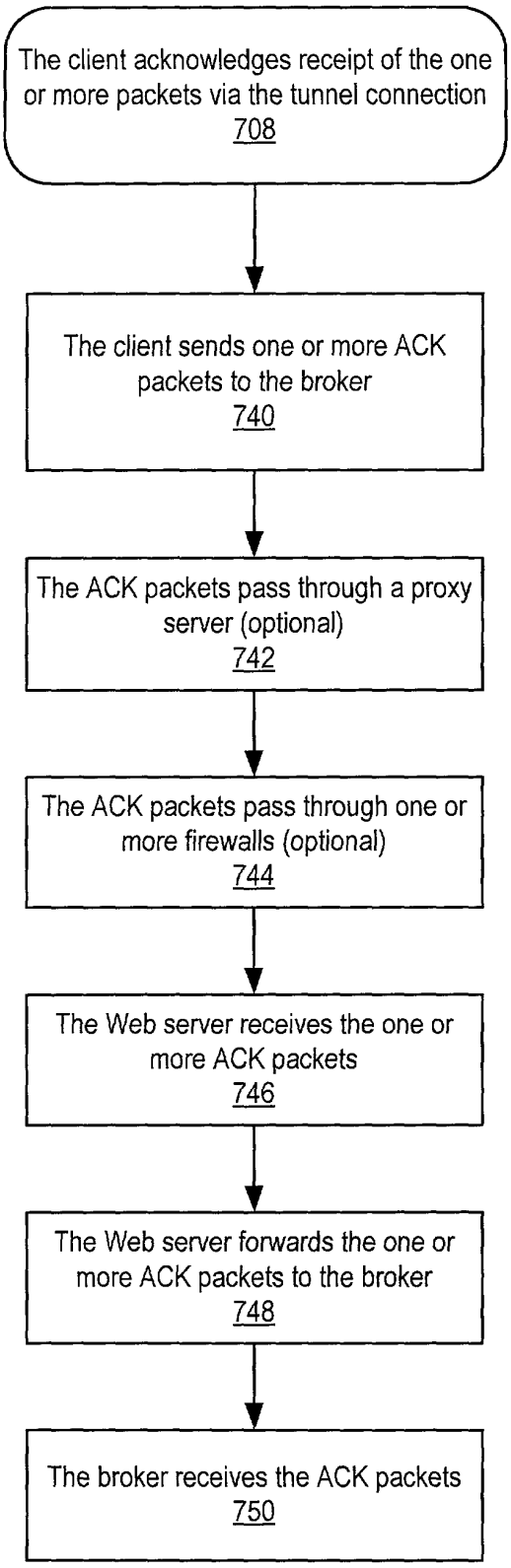
The client acknowledges receipt of the one or more packets via the tunnel connection
708
The client sends one or more ACK packets to the broker
740
The ACK packets pass through a proxy server (optional)
742
The ACK packets pass through one or more firewalls (optional)
744
The Web server receives the one or more ACK packets
746
The Web server forwards the one or more ACK packets to the broker
748
The broker receives the ACK packets
750

Figure 7C

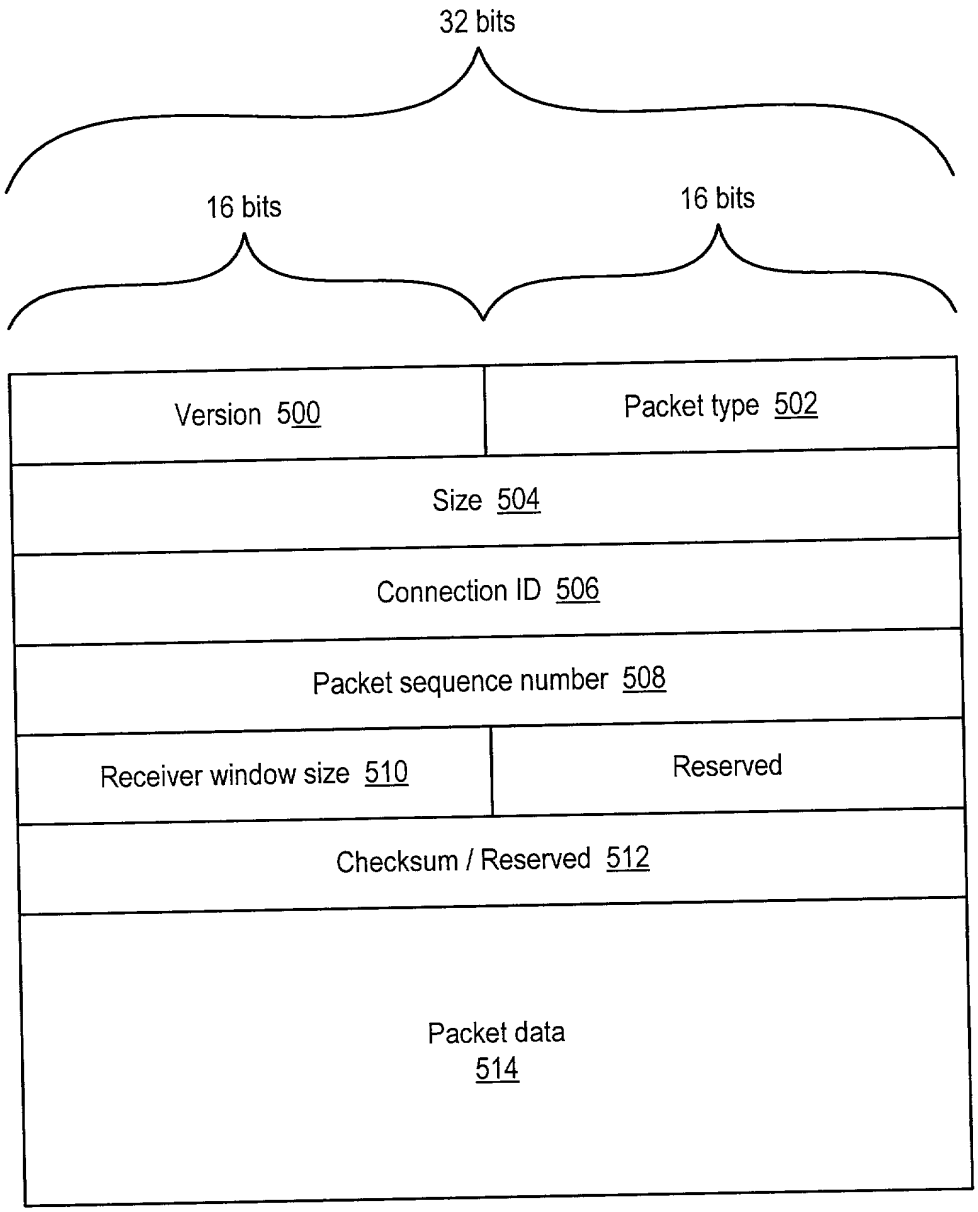

Figure 8

Exemplary tunneling packet format